

A REVISION OF THE BEE GENUS CROCISA IN THE  
PHILIPPINES

(Hymenoptera, Apidae)

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The bee genus *Crocisa* (subfamily Anthophorinae, tribe Melectini) is distributed throughout the entire Eastern Hemisphere. This study is limited to those species in the Philippines, where there are five known species, one of which is described as new in this paper. The genus is easily distinguished from other bees by the scutellum, which is flat, projecting posteriorly like a roof, and with a median apical emargination. In the Philippines it is the most highly ornamented genus, being remarkable for its metallic bluish markings.

Cockerell (1910, 1919) described four species of *Crocisa* from the Philippines, using color and a very few structural characteristics. His keys and descriptions are somewhat unsatisfactory, and one of the writer's aims is to redescribe the Cockerell species, emphasizing the more stable structural and color characteristics, so that future workers may have a better understanding of the species. Meyer (1921), in his general monograph of *Crocisa*, has 117 described species, including two of the four Philippine species described by Cockerell. It is doubtful that he saw these two Philippine species, as his descriptions of them are almost copies of those by Cockerell.

In this revisional study the writer was fortunate in obtaining most of the available specimens of *Crocisa* from the Philippine Islands. During World War II the insect collections in the Philippines were destroyed; so the specimens received from that country have been collected since the war. The writer has been to Washington to see the Philippine *Crocisa* material in the Baker Collection, as well as other specimens of the genus, and while there saw the type and paratype of *C. crucifera*; also specimens of other species described and determined by Cockerell.

The work as a whole has been done under the supervision of Dr. Henry K. Townes, and the writer wishes to express his thanks for this assistance and encouragement. I would also like to thank his family, who collected and returned from the Philippines with these spectacularly beautiful bees and permitted me to work on them. The writer is indebted to Dr. Theodore B. Mitchel in

assuming responsibility for loaned specimens from the U.S. National Museum and for advice and other assistance—also to Mr. Santiago R. Capco of the Bureau of Plant Industry, Manila, and to Dr. S. M. Cendaña of the College of Agriculture, Laguna, Philippines, for sending their collections for study.

### Genus CROCISA Jurine

*Crocisa* Jurine, 1801, Erlangen Litteratur-Zeitung, vol. 1, p. 164. Three species.

Type: *Nomada scutellata* (= *Melecta histrionica* Illiger, 1806 = *Nomada scutellaris* Fabricius, 1781). (By designation of Morice and Durrant, Trans. Ent. Soc., London, p. 423, 1915.)

*Thyreus* Panzer, 1806, Kritische Revision de Insektenfaune Deutschlands, vol. 2, p. 263, 1806. Type: *Nomada scutellaris* Fabricius, 1781 (Monobasic).

*Crocissa* Panzer, 1806, Kritische Revision de Insektenfaune Deutschlands, vol. 2, p. 263, 1806. *Lapsus* for *Crocisa* Jurine, 1801.

Head transverse, narrower than thorax; labrum free, four-cornered, with two lateral basal elevations; mandible with inner margin bidentate; eyes strongly narrowed and contracted above; antenna filiform; labial palpus four-segmented, the basal segment elongate, full half the length of the prementum, the second less than half the length of the first, the third and 4th short; maxillary palpus two-segmented; scutellum flat and medially emarginate; basitibial plates absent; fore wing with radial cell narrow, rounded at base and apex; three submarginal cells, the first measured on the cubital vein about equal in length to the second and third united; pubescence of either scale-like or plumose hairs; female with pygidial plate rounded apically.

*Crocisa* is similar to *Melecta* but is distinguished by having a flat, expanded scutellum which is medially emarginate posteriorly, and the maxillary palpus two-segmented; *Melecta* has dorsal lobes of scutellum armed with a tooth or spine, and has the maxillary palpus five-segmented or with a short sixth segment. The species of *Crocisa*, as far as known, are parasites in the nests of *Anthophora*.

Up to the present time, two names have been proposed for the genus: *Crocisa* Jurine, 1801 and *Thyreus* Panzer, 1806. The genus *Crocisa* was first named in the "Erlangen List" published at Erlangen, Germany, in May, 1801. This article contains a synoptic list of the Panzer-Jurine genera, comparing them with the genera adopted by Fabricius. Although written by Panzer the authorship of all of the new names is accredited to Jurine. In 1939, in its Opinion 135, the International Commission of Zoological Nomenclature suppressed the Erlangen List, stating that adopting the new names contained therein would result in greater con-

fusion than uniformity, and that the paper therefore should be treated as though it had never been published. However, *Crocisa* is a well-known name, validly proposed, and associated with an extensive literature. It should not be discarded for arbitrary reasons. The writer is not in agreement with the International Commission's opinion that the Erlangen List should be considered as unpublished and he favors continuing the use of the generic name *Crocisa*.

#### KEY TO THE PHILIPPINE SPECIES OF THE GENUS CROCISA

1. Bluish body hairs plumose; hind femur of male (as far as known) without median ventral angle .....2
- Bluish body hairs scale-like; hind femur of male with median ventral angle .....4
2. Scutellum with one whitish-blue spot, at point of apical incision; hair fringe present underneath at point of scutellar emargination; wings light fuliginous, with membrane lighter than the veins.....*irisana* Cockerell
- Scutellum entirely black, without a spot; hair fringe absent underneath at point of scutellar emargination; wings dark fuliginous, with membrane about as dark as the veins.....3
3. Longitudinal bluish patch on median mesoscutal line about 0.3 length of mesoscutum; scutellum with depth of apical notch about 0.1 its breadth, notch not sharper medially, its sides almost straight; dorsal transverse color band on first metasomal segment interrupted medially by a longitudinal black band.....*janasivia* Sivik, new species
- Longitudinal bluish patch on median mesoscutal line about 0.6 length of mesoscutum; scutellum with depth of apical notch about 0.14 its breadth, notch sharper medially, its sides sinuate; dorsal transverse color band on first metasomal segment continuous medially.....*luzonensis* Cockerell
4. Scutellum with two blue spots, one on each lobe; dorsal transverse color band on first metasomal segment interrupted medially by an irregular-shaped longitudinal black band .....*crucifera* Cockerell
- Scutellum entirely black, without spots; dorsal transverse color band on first metasomal segment continuous medially but with a basal black notch .....*caelestina* Cockerell

#### CROCISA IRISANA Cockerell

(Figures 4, 7)

*Crocisa irisana* Cockerell, 1910. Entomologist 43:219. ♀

*Female*.—Fore wing about 10 mm. long. Supraclypeal area with keeled frontal line about 0.4 length of face; clypeus very minutely punctured; mandible with small rounded tooth on inner margin about 0.45 length of mandible from apical end, and with another small tooth about 0.7 from apical end; flagellar segments two to nine each with a deep longitudinal indentation on outer lateral surface; scutellum with depth of apical notch about 0.25 its breadth, its sides almost straight (figure 4), its dorsal surface moderately punctured with plumose hairs thickly branched; tegula minutely punctured; apical half of outer lateral border of malus serrated, apical spine

of malus about 0.3 length of malus; mid coxa with anterior carina extending about 0.5 to 0.7 from apex toward episternum; median ventral carina on hind femur extending almost entire length of the femur. Black, with whitish-blue markings of plumose hairs as follows: entire paraocular area and supraclypeal area; basal 0.4 of clypeus; scattered few hairs on labrum and within the ocellar triangle; entire genal area and post-occipital ridge; two transverse spots, 1.2 to 1.5 mm. long, on pronotum and adjacent ones, 0.9 to 1.2 mm. long, on mesocutum; four rounded spots, 0.4 to 0.7 mm. in diameter, on mesoscutum; a spot, 0.4 to 0.6 mm. in diameter, on scutellum at point of apical incision; hair fringe underneath scutellum at point of emargination; a lateral longitudinal patch on mesoscutum above tegula, about 0.5 mm. long; a spot on apical 0.4 of tegula; upper 0.6 of epimeron; scattered few hairs on mesosternum and on upper 0.3 of metapleuron; outer surface of fore, mid and hind tibiae (extending almost or quite the full length on the fore tibia, about 0.5 the length on the mid tibia and about 0.6 the length on the hind tibia); scattered few hairs on trochanters; entire outer surface of metatarsus; a spot on outer lateral apical surface of mid and hind femur; broad transverse bands, interrupted in the middle, on first to fifth dorsal metasomal segments, the first band broadest and its median interruption rhomboidal, apical margin on first dorsal metasomal segment and basal margin on the second to fifth dorsal metasomal segments without blue hairs; scattered few hairs on the sternites. Wings light fuliginous.

*Male*:—Similar to the female except for the usual sexual differences and as follows: fore wing about 9 mm. long; supraclypeal area with keeled frontal line about 0.35 length of face; flagellar segments two to ten each with a deep longitudinal indentation on posterior surface; lateral border of malus not serrated, apical spine of malus about 0.2 length of malus; median ventral carina on hind femur extending about half the length of femur.

*Specimens examined*: ♂, ♀, Isabela, Ilagan, May 6, 1952, S. M. Cendaña (College of Agriculture at Laguna). ♀, Ligao, Albay, March 28, 1949, V. J. Madrid (Bureau of Plant Industry at Manila). ♀, Manila, Robert Brown (U.S. National Museum). ♀, Mount Maquiling, Luzon, C. F. Baker (U.S. National Museum). ♀, Mount Maquiling at 150', Luzon, March 7, 1947, A. Bustillus (College of Agriculture at Laguna). ♀, Mount Maquiling at 960', Luzon, February 22, 1948, P. Alfonso (writer's collection). ♂, Mount Maquiling at 160', Luzon, August 3, 1948, L. B. Uichanco (writer's collection). ♀, Orion, Bataan, July 5, 1953, P. C. Feliciano (Bureau of Plant Industry at Manila).

One species was collected on flowers of *Duranta repens* on Mount Maquiling.

***Crocisa janasisia* Sivik, new species**

(Figure 2)

*Female*:—Fore wing 11 mm. long. Supraclypeal area with keeled frontal



line about 0.38 length of face; clypeus with mixed coarse and minute punctures; mandible with small triangular-shaped tooth on inner margin about 0.45 length of mandible from apical end, and with another small tooth about 0.75 from apical end; flagellar segments two to nine each with a deep longitudinal indentation on outer lateral surface; scutellum with depth of apical notch about 0.1 its breadth, its sides almost straight (figure 2), its dorsal surface moderately punctured, with plumose hairs thickly branched; tegula minutely punctured; apical 0.7 of outer lateral border of malus serrated, apical spine of malus about 0.35 length of malus; mid coxa with anterior carina extending from apex to episternum; median ventral carina extends about 0.8 the length on hind femur. Black, with bluish markings of plumose hairs as follows: entire paraocular area, supraclypeal area and clypeus; scattered few hairs on labrum; entire genal area; postoccipital ridge, interrupted in middle; two transverse spots, 0.8 to 1.0 mm. long, on pronotum and adjacent ones, 0.7 to 0.9 mm. long, on mesoscutum; a longitudinal patch, 0.6 to 0.8 mm. long, on the median mesoscutal line; a spot, 0.3 to 0.5 mm. in diameter, on center of each half of mesoscutum; a lateral longitudinal patch on mesoscutum, above tegula, 0.6 to 0.8 mm. long; a spot, 0.4 to 0.7 mm. in diameter, on mesoscutum in front of each axilla; upper 0.4 of epimeron; a spot, 0.4 to 0.6 mm. in diameter, on anterior center of epimeron; scattered few hairs on mesosternum; outer surface of fore, mid and hind tibiae (extending almost or quite the full length on the fore tibia, about 0.8 the length on the mid tibia and about 0.5 the length on the hind tibia); scattered few hairs on the mid coxa; broad transverse bands, interrupted in the middle, on first to fifth dorsal metasomal segments, the first band broadest with its basal median interruption extending just beyond the ends of the scutellum, its apical interruption about 0.3 that of the basal. Wings dark fuliginous.

*Holotype*: 1 ♀, SAMAR ISLAND, C. F. Baker (U.S. National Museum).

This specimen appears to be aged, as some of the bluish markings seem to be faded.

#### CROCISA LUZONENSIS Cockerell

(Figure 1)

*Crocisa luzonensis* Cockerell, 1919. Ann. Mag. Hist. (8)5:419. ♀

*Female*:—Fore wing about 13 mm. long. Supraclypeal area with keeled frontal line about 0.5 length of face; clypeus moderately coarsely punctured; mandible with small triangular-shaped tooth on inner margin about 0.4 length of mandible from apical end, and with another small tooth about 0.7 from apical end; flagellar segments two to nine each with a shallow longitudinal indentation on outer lateral surface; scutellum with depth of apical notch about 0.14 its breadth, the notch sharper medially with sides weakly sinuate (figure 1), its dorsal surface sparsely punctured, with plumose hairs thinly branched; tegula minutely punctured; apical 0.7 of outer lateral border of malus serrated, apical spine of malus about 0.3 length of malus; mid coxa with anterior carina extending from apex to episternum; median ventral carina extending almost entire length on hind

femur. Black, with bluish markings of plumose hairs as follows; entire paracul area, supraclypeal area and clypeus; scattered few hairs on labrum; entire genal area; postoccipital ridge, interrupted in middle; two traverse spots, 1.5 to 1.8 mm. long, on pronotum; a longitudinal patch, 2.5 to 2.8 mm. long, on the median mesoscutal line; a spot, 0.3 to 0.5 mm. in diameter, on center of each half of mesoscutum; a lateral longitudinal patch on mesoscutum, above tegula, 1.6 to 1.8 mm. long; a lateral spot, 1.4 to 1.8 mm. wide, at apex of mesoscutum; a spot at basal and apical corner of tegula; hair fringe underneath scutellar notch; upper 0.5 of epimeron; scattered few hairs on mesosternum; small lateral apical area on fore and mid femur; outer surface of fore, mid and hind tibiae (extending almost or quite the full length on the fore and mid tibiae, about 0.5 the length on the hind tibia); scattered few hairs on mid and hind coxae and trochanters; entire outer surface of tarsi; a spot on lateral apical surface of fore and mid femur; dorsal part of first metasomal segment except for a median rectangular black area which may be open anteriorly; broad apical bands on second to fourth, but interrupted on the fifth by a median longitudinal black band. Wings dark fuliginous.

*Male*:—Similar to the female except for the usual sexual differences and as follows: fore wing about 13 mm. long; supraclypeal area with keeled frontal line about 0.4 length of face; flagellar segments two to ten each with a shallow subovate indentation on posterior surface; lateral border of malus not serrated, apical spine of malus about 0.2 length of malus; median ventral carina on hind femur extending about half the length of femur.

*Specimens examined*: ♀, Imugan, Nueva Vizcaya, C. F. Baker (writer's collection). ♀, Baybay, Leyte, August 17, 1945, D. G. Hall (U.S. National Museum). ♀, Mount Canlaon at 3600', Negros Oriental, May 2, 1953, H., M., and D. Townes (Bureau of Plant Industry at Manila). ♂, Mount Canlaon at 3600', Negros Oriental, May 7, 1953, H., M., and D. Townes (writer's collection).

While preparing the male genitalia of the only male specimen for study, the writer kept it in the potassium hydroxide solution too long, consequently it "cleared" too much.

### CROCISA CRUCIFERA Cockerell

(Figures 3, 6)

*Crocisa crucifera* Cockerell, 1919. Philippine Jour. Sci. 14:198. ♀ and ♂

*Female*:—Fore wing 9 to 12 mm. long. Supraclypeal area with keeled frontal line about 0.4 length of face; clypeus minutely punctured; mandible with small rounded tooth on inner margin about 0.6 length of mandible from apical end, and with another small tooth about 0.75 from apical end; flagellar segments two to nine each with a deep longitudinal indentation on outer lateral surface; scutellum with depth of apical notch about 0.16 its breadth, its side sinuate (figure 3), its dorsal surface sparsely punctured, with plumose hairs thickly branched; tegula very minutely punctured; apical 0.7 of outer lateral border of malus serrated, apical spine about 0.3 length

of malus; mid coxa with anterior carina extending about 0.3 to 0.5 from apex toward episternum; median ventral carina at about basal 0.3 on hind femur. Black, with bluish markings of predominately scale-like hairs as follows: entire paraocular area, supraclypeal area and clypeus; scattered few hairs on labrum; two small patches within the ocellar triangle; entire genal area; two transverse spots, 1.2 to 1.5 mm. long, on pronotum and adjacent ones, 0.9 to 1.2 mm. long, on mesoscutum; a longitudinal patch, 1.2 to 1.5 mm. long, on the median mesoscutal line; a spot, 0.7 to 0.9 mm. in diameter, on center of each half of mesoscutum; a lateral longitudinal patch on mesoscutum, above tegula, 1.0 to 1.2 mm. long, connecting apically with a spot, 0.9 to 1.1 mm. in diameter; a spot, about 1 mm. in diameter, on each lobe of scutellum; upper 0.5 of epimeron; two areas, mixed with plumose hairs, on mesosternum; outer surface of fore, mid and hind tibiae (extending almost or quite the full length on the fore and mid tibiae, about 0.7 the length on the hind tibia); scattered few hairs on outer sides of fore and mid tarsus, mid and hind coxae and trochanters; broad transverse bands, interrupted in middle 0.15, on first to fifth dorsal metasomal segments, basal margin of first dorsal metasomal segment and both apical and basal margins of second to fifth dorsal metasomal segments without bluish hairs; scattered few hairs on the sternites. Wings dark fuliginous.

*Male*:—Similar to the female except for the usual sexual differences and as follows: fore wing 8 to 11 mm. long; supraclypeal area with keeled frontal line about 0.35 length of face; flagellar segments two to ten each with a deep longitudinal indentation on posterior surface; lateral border of malus not serrated, apical spine of malus about 0.15 length of malus; median ventral angle at about 0.5 on hind femur.

*Types*: ♀ (type), Los Baños, C. F. Baker (U.S. National Museum). ♀ (paratype), Los Baños, C. F. Baker (U.S. National Museum).

*Specimens examined*: Many males and females from the following Philippine provinces: Bataan (Balanga, July 18; Orion, July 5); Batanes (Batan Island, May 1918); Batangas (Cuenca, Feb. 2, 1954; Lipa, Jan. 26); Bukidnon (Musuan, June 24, 1953); Cagayan (Gattaran at 1100', May 19, 1952); Cotabato, (Lagao, Jan. 11, 1954! Parang, Mar. 23); Davao (Davao); Iloilo (Culasi, May 1918); Laguna (Los Baños, Feb. 7, 1954 and June 5, 1953; Mount Banahao; Mount Maquiling, Mar. 18 and May 14); Lanao (Iligan; Kolambugan); Leyte (Maripipi, Aug. 10; Mount Pangasugan at 328', May 19, 1952); Misamis Oriental (Cagayan de Oro); Negros Oriental (Cuernos; Mount Canlaon at 3600', Apr. 30) Palawan (Babuyan, Dec. 6; Puerto Princesa, Oct. 1925 and Dec. 7); Romblon (Sibuyan Island); Samar; Surigao; Quezon (Casagivian) and Zamboanga (Dapitan; Zamboanga). Also from Manila, April 1924 and "N. W. Panay Island."



Flower records on the above specimens include *Antigonon leptopus* and *Muntingia Calabura* on Mount Maquiling at an elevation of 160'.

CROCISA CAELESTINA Cockerell

(Figures 5, 8)

*Crocisa caelestina* Cockerell, 1919. Philippine Jour. Sci. 14:196. ♀

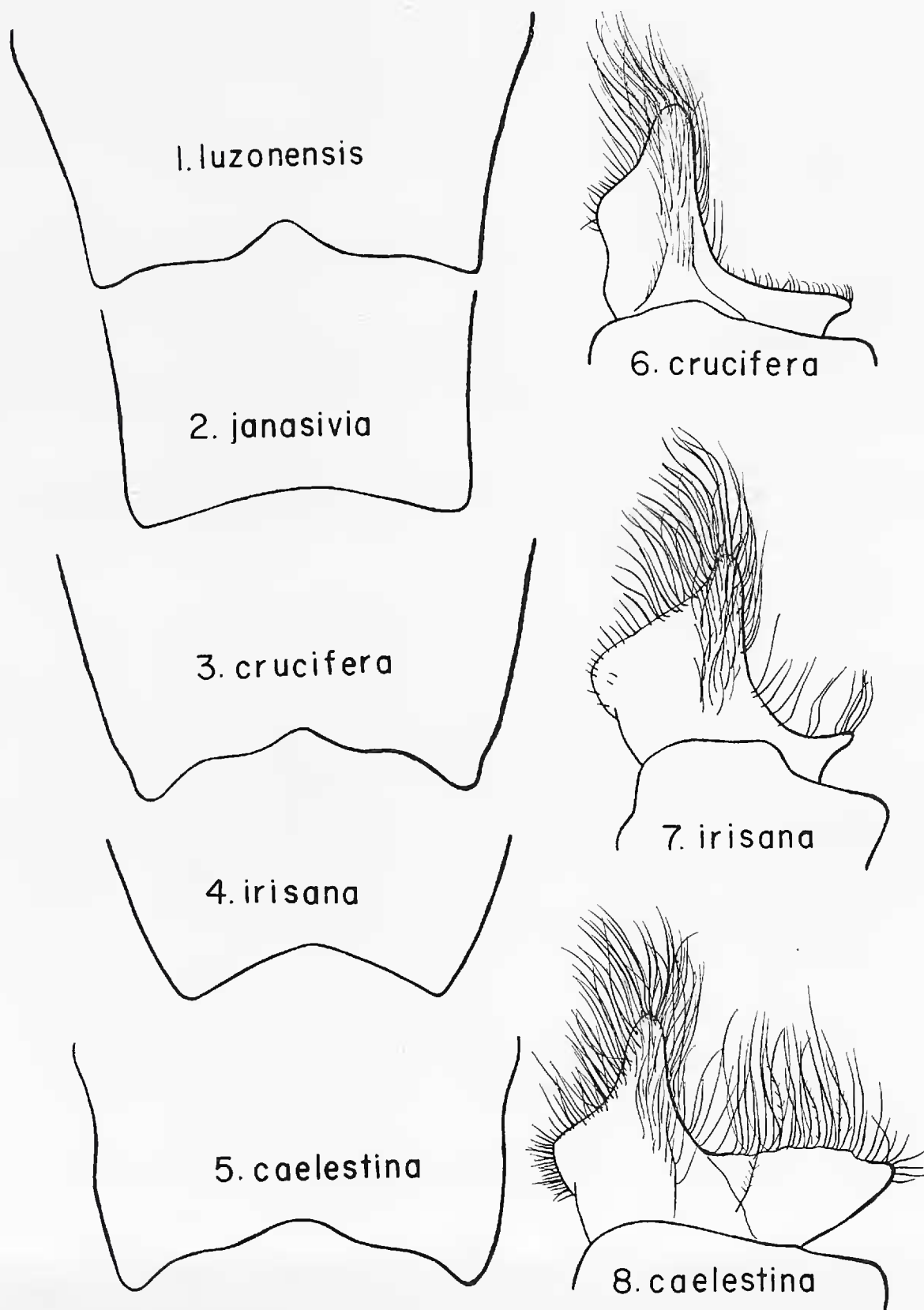
*Female*:—Fore wing 11 to 13 mm. long. Supraclypeal area with keeled frontal line about 0.45 length of face; clypeus finely and closely punctured; mandible with triangular-shaped tooth on inner margin about 0.4 length of mandible from apical end, and with another small tooth about 0.7 from apical end; flagellar segments two to nine each with a shallow longitudinal indentation on outer lateral surface; scutellum with depth of apical notch about 0.16 its breadth, its sides sinuate (figure 5), its dorsal surface moderately punctured, with plumose hairs thinly branched; tegula moderately punctured; apical 0.7 of outer lateral border of malus serrated, apical spine of malus about 0.2 length of malus; mid coxa with anterior carina extending about 0.5 to 0.7 from apex toward episternum; median ventral carina at about basal 0.3 on hind femur. Black, with bluish markings of predominantly scale-like hairs as follows: entire paraocular area, supraclypeal area and clypeus; scattered few hairs on labrum; two small patches within the ocellar triangle; entire genal area; two transverse spots, 0.9 to 1.1 mm. long (one specimen measured 1.7 to 1.9 mm. long) on pronotum and adjacent ones, 0.8 to 1.0 mm. long (one specimen measured 1.6 to 1.8 mm. long) on mesoscutum; a longitudinal patch, 1.0 to 1.2 mm. long (one specimen measured 1.3 to 1.5 mm. long) on median mesoscutal line; a spot, 0.5 to 0.7 mm. in diameter, on center of each half of mesoscutum; a lateral longitudinal patch on mesoscutum above tegula, 0.9 to 1.1 mm. long (one specimen measured 1.4 to 1.6 mm. long); a spot, 0.6 to 0.8 mm. in diameter at apex of mesoscutum; upper 0.5 of epimeron; scattered few hairs on mesosternum; outer surface of fore, mid and hind tibiae (extending almost or quite the full length on the fore and mid tibiae, about 0.5 the length of the hind tibia); scattered few hairs on fore metatarsus; broad transverse bands, continuous on first dorsal metasomal segment except for a median roundish or squarish apical notch, continuous on second to fifth dorsal metasomal segments except for a longitudinal band in the middle. Wings dark fuliginous.

*Male*:—Similar to the female except for the usual sexual differences and as follows: fore wing about 11 mm. long; supraclypeal area with keeled frontal line about 0.4 length of face; flagellar segments two to ten each with a shallow subovate indentation on posterior surface; lateral border of malus not serrated, apical spine of malus about 0.1 length of malus; median ventral angle at about 0.5 on hind femur.

*Specimens examined*: ♀, Cotabato, Cotabato, October 2, 1953, H. Townes (Townes Collection). 2 ♀♀ and 1 ♂, Kolambugan, Mindanao, C. F. Baker (U.S. National Museum). 2 ♀♀ and 1 ♂, Mount Canlaon at 3600', Negros Oriental, May 1, May 7 and



May 9, 1953, H. M., and D. Townes (writer's collection). ♀, Mount Canlaon at 4200', Negros Oriental, May 11, 1953, H. M., and D. Townes (Bureau of Plant Industry at Manila).



EXPLANATION OF FIGURE

Fig. 1-5, posterior margin of scutellum; figs. 6-8, lateral aspect of male gonostylus.

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